

binding, as discussed above. However, repeating the method 400 each time that the UE context is moved from one AMF to another AMF may be resource intensive, especially at the UE 402. Therefore, there is a need for improved methods for changing (e.g., adjusting, or hand off between) AMFs without changing an associated RAN when the UE is in connected mode.

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SUMMARY OF THE INVENTION

[0024] The exemplary embodiments disclosed herein are directed to solving the issues relating to one or more of the problems presented in the prior art, as well as providing additional features that will become readily apparent by reference to the following detailed description when taken in conjunction with the accompany drawings. In accordance with various
10 embodiments, exemplary systems, methods, devices and computer program products are disclosed herein. It is understood, however, that these embodiments are presented by way of example and not limitation, and it will be apparent to those of ordinary skill in the art who read the present disclosure that various modifications to the disclosed embodiments can be made while remaining within the scope of the invention.

[0025] In one embodiment, a method includes: receiving a radio access network (RAN)-user equipment (UE) identifier from a first access and mobility management function (AMF), the RAN-UE identifier configured to identify a UE for a RAN; producing an AMF-UE identifier, the AMF-UE identifier configured to identify the UE for a second AMF; selecting a transport network layer association (TNLA) link to the RAN; and sending the AMF-UE identifier to the
20 RAN.

[0026] In a further embodiment, a method includes: receiving a message including a first access and mobility management function (AMF)-user equipment (UE) identifier that identifies a UE for a first AMF from the radio access network (RAN); retrieving UE context information

from a data store using the first AMF-UE identifier; producing a second AMF-UE identifier, the second AMF-UE identifier configured to identify the UE for a second AMF; and sending the second AMF-UE identifier to the RAN.

[0027] In another embodiment, an apparatus includes: a receiver configured to receive a radio access network (RAN)-user equipment (UE) identifier from a first access and mobility management function (AMF), the RAN-UE identifier configured to identify a UE for a RAN; at least one processor configured to: produce an AMF-UE identifier, the AMF-UE identifier configured to identify the UE for a second AMF; and select a transport network layer association (TNLA) link to the RAN; and a transmitter configured to send the AMF-UE identifier to the RAN.

[0028] In yet another embodiment, an apparatus includes: a receiver configured to receive a message including a first access and mobility management function (AMF)-user equipment (UE) identifier that identifies a UE for a first AMF from the radio access network (RAN); at least one processor configured to: retrieve UE context information from a data store using the first AMF-UE identifier; and produce a second AMF-UE identifier, the second AMF-UE identifier configured to identify the UE for a second AMF; and a transmitter configured to send the second AMF-UE identifier to the RAN.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] Various exemplary embodiments of the invention are described in detail below with reference to the following Figures. The drawings are provided for purposes of illustration only and merely depict exemplary embodiments of the invention to facilitate the reader's understanding of the invention. Therefore, the drawings presented herein should not be

CLAIMS

What is claimed is:

- 5 1. A method, comprising:

receiving a radio access network (RAN)-user equipment (UE) identifier from a first access
and mobility management function (AMF), the RAN-UE identifier configured to identify a UE for
a RAN;

producing an AMF-UE identifier, the AMF-UE identifier configured to identify the UE for
10 a second AMF;

selecting a transport network layer association (TNLA) link to the RAN; and

sending the AMF-UE identifier to the RAN.
2. The method of claim 1, comprising:
15 sending the AMF-UE identifier to the RAN via the TNLA link.
3. The method of claim 1, wherein:

the RAN-UE identifier is further configured to identify a UE context for the RAN,
the AMF-UE identifier is further configured to identify the UE context for the second
20 AMF, and

the UE context is associated with UE context information, wherein the UE context
information comprises information selected from the group consisting of: a UE identifier, a UE
security state parameter, a UE mobile state parameter, and a UE mobility parameter.

4. The method of claim 1, wherein the RAN-UE identifier is a RAN UE N2AP ID.
5. The method of claim 1, wherein the AMF-UE identifier is an AMF UE N2AP ID.
- 5 6. A method, comprising:
 - receiving a message including a first access and mobility management function (AMF)-
user equipment (UE) identifier that identifies a UE for a first AMF from a radio access network
(RAN);
 - retrieving UE context information from a data store using the first AMF-UE identifier;
 - 10 producing a second AMF-UE identifier, the second AMF-UE identifier configured to
identify the UE for a second AMF; and
 - sending the second AMF-UE identifier to the RAN.
7. The method of claim 6, comprising sending a N2 message via an N2 interface to the
15 RAN, the N2 message comprising the second AMF-UE identifier.
8. The method of claim 6, wherein the second AMF-UE identifier is an AMF UE N2AP
ID.
- 20 9. The method of claim 6, wherein:
 - the first AMF-UE identifier further identifies a UE context for the first AMF from the
RAN,

the second AMF-UE identifier is further configured to identify the UE context for the second AMF, and

the UE context information comprises information selected from the group consisting of: a UE identifier, a UE security state parameter, a UE mobile state parameter, and a UE mobility
5 parameter.

10. An apparatus, comprising:

a receiver configured to receive a radio access network (RAN)-user equipment (UE) identifier from a first access and mobility management function (AMF), the RAN-UE identifier
10 configured to identify a UE for a RAN;

at least one processor configured to:

produce an AMF-UE identifier, the AMF-UE identifier configured to identify the UE for a second AMF; and

select a transport network layer association (TNLA) link to the RAN; and

15 a transmitter configured to:

send the AMF-UE identifier to the RAN.

11. The apparatus of claim 10, wherein:

the transmitter is further configured to:

20 send the AMF-UE identifier to the RAN via the TNLA link.

12. The apparatus of claim 10, wherein:

the RAN-UE identifier is further configured to identify a UE context for the RAN,

the AMF-UE identifier is further configured to identify the UE context for the second AMF, and

the UE context is associated with UE context information, and wherein the UE context information comprises information selected from the group consisting of: a UE identifier, a UE security state parameter, a UE mobile state parameter, and a UE mobility parameter.

13. The apparatus of claim 10, wherein the RAN-UE identifier is a RAN UE N2AP ID.

14. The apparatus of claim 10, wherein the AMF-UE identifier is an AMF UE N2AP ID.

15. An apparatus, comprising:

a receiver configured to receive a message including a first access and mobility management function (AMF)-user equipment (UE) identifier that identifies a UE for a first AMF from a radio access network (RAN);

at least one processor configured to:

retrieve UE context information from a data store using the first AMF-UE identifier; and

produce a second AMF-UE identifier, the second AMF-UE identifier configured to identify the UE for a second AMF; and

a transmitter configured to send the second AMF-UE identifier to the RAN.

16. The apparatus of claim 15, wherein the transmitter is further configured to send a N2 message via a N2 interface to the RAN, the N2 message comprising the second AMF-UE identifier.

17. The apparatus of claim 15, wherein the second AMF-UE identifier is an AMF UE N2AP ID.

5 18. The apparatus of claim 15, wherein:
the first AMF-UE identifier further identifies a UE context for the first AMF from the RAN,
the second AMF-UE identifier is further configured to identify the UE context for the second AMF, and
10 the UE context information comprises information selected from the group consisting of: a UE identifier, a UE security state parameter, a UE mobile state parameter, and a UE mobility parameter.

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